

REMARKS

The Examiner has rejected claims 8, 11, 20, 22 and 24-47 pending in the present application. By the present amendment, claims 8, 20, 32 and 40 have been amended, claims 29, 31, 39 and 47 have been cancelled, and new claim 48 has been added. After the present amendment, claims 8, 11, 20, 22 and 24-28, 30, 32-38, 40-46 and 48 are pending in the present application. Applicant respectfully requests reconsideration and allowance of the pending claims for the reasons stated below.

A. Rejection of Claims 8, 11, 20, 22 and 24-47 Under 35 USC §103(a)

The Examiner has rejected claims 8, 11, 20, 22 and 24-47 under 35 USC §103(a) as being unpatentable over Gersho, et al. (USPN 6,233,550) (hereinafter “Gersho ‘550”) in view of Ertem, et al. (USPN 6,453,289) (hereinafter “Ertem ‘289”). For the reasons that follow, applicant respectfully disagrees and kindly submits that the present invention, as defined by independent claims 8, 20, 32 and 40, is patentably distinguishable over the cited references of record, considered either solely or in combination.

First, applicant notes the Examiner’s response to applicant’s arguments, where the Examiner refers to *In re Keller* (CCPA 1981) for the proposition that the test for obviousness is that the combined teachings of Gersho ‘550 and Ertem ‘289 must suggest the invention to those of ordinary skill in the art; and the Examiner further cites *Greshon* (CCPA 1967) that it is sufficient if the Gersho ‘550 and Ertem ‘289 suggest doing what applicants did, although they do not teach or suggest exactly why this should be done. Applicant respectfully submits that Gersho ‘550 and Ertem ‘289, neither solely nor in combination, suggest or even come close to suggest

doing what applicant has invented and claimed in the pending independent claims, as discussed below.

Further, in order to clarify the legal standard for determination of obviousness, applicant would also like to present the following guidance from the Federal Circuit in 1992 and 1995, regarding the appropriate test for obviousness:

“The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification” (emphasis added) (In re Gordon, 733 F.2d 900, 902 (Fed. Cir. 1984) (see also In re Fitch, 972 F.2d 1260 (Fed. Cir. 1992)).

In a proper obviousness determination, "whether the changes from the prior art are 'minor', ... the changes must be evaluated in terms of the whole invention, including whether the prior art provides any teaching or suggestion to one of ordinary skill in the art to make the changes that would produce the patentee's ... device." (citations omitted.) This includes what could be characterized as simple changes, as in *In re Gordon*, 733 F.2d 900, 902, 221 U.S.P.Q. (BNA) 1125, 1127 (Fed. Cir. 1984) **(Although a prior art device could have been turned upside down, that did not make the modification obvious unless the prior art fairly suggested the desirability of turning the device upside down)**. (emphasis added) (In re Chu, 66 F.3d 292, 298 (Fed. Cir. 1995)).

Independent claim 8, as amended, specifies a method for classifying a speech signal having a background noise portion with background noise level, the method comprising the steps of: “extracting a parameter from the speech signal; estimating a noise component of the parameter; removing the noise component from the parameter to generate a noise-free parameter; selecting a pre-determined threshold, wherein the step of selecting said pre-determined threshold is unaffected by said background noise level; comparing the noise-free parameter with said pre-determined threshold; and associating the speech signal with a class in response to the comparing step.” By the present amendment, applicant has amended claim 8 and other independent claims

to clarify that selection of the pre-determined threshold for classification is unaffected by the background noise level. As explained in the present application, this particular technique provides significantly improved robust classification in speech coding without the complexity and the power and memory consumption suffered by conventional approaches. See, for example, page 8, line 19 to page 9, line 6 of the present application.

In contrast, neither Gersho '550 nor Ertem '289 disclose or remotely *suggest the desirability of modifying Gersho '550 to achieve the invention of claim 8.* (See In re Fitch and In re Chu.) First, the Examiner states that Gersho '550 teaches the following element at col. 19, lines 24-36: "comparing the noise-free parameter with said pre-determined threshold". Applicant respectfully disagrees. Applicant has studied the cited excerpt of Gersho '550 and does not find any reference to a pre-determined threshold or a comparison against such threshold. In fact, Gersho '550 is quite clear that no such threshold or comparison would be needed in Gersho '550 based on the following statements, which describe the classification system of Gersho '550:

Classifier design requires parameters selection and the choice of discriminant function. We chose a large set of parameters which were shown to be important for speech classification in various applications. We avoided the difficulties in the design of discriminant function by employing a neural network classifier trained from a large training set of examples. (Col. 18, lines 59-65.) (emphasis added.)

The classification parameters from the previous, current, and the next frame are fed into a feed-forward neural network, which was trained from a large database of classification examples. The output of the net from the previous frame is also fed into the net to assist in the decision of the current frame. The output of the neural network consists of three neurons, and the neuron with the highest level indicates the class. (Col. 18, line 66 - Col. 19, line 6.)

Accordingly, Gersho '550 does not teach comparing the noise-free parameter with said pre-determined threshold, such as a spectral tilt parameter, a pitch correlation parameter or an

absolute maximum parameter, but in fact, to avoid the difficulties in the design of discriminant function, Gersho '550 uses a neural network classifier trained from a large training set of examples.

Furthermore, as the Examiner acknowledges, Gersho '550 fails to disclose “estimating a noise parameter and removing the noise component from the parameter to generate a noise-free parameter”, as specified by claim 8. Additionally, for the same reasons stated in the preceding paragraph, Gersho '550 also fails to disclose or suggest “selecting a pre-determined threshold, wherein the step of selecting said pre-determined threshold is unaffected by said background noise level”, since Gersho '550 does not even use thresholds for comparison against noise-free parameters (such as a spectral tilt parameter, a pitch correlation parameter or an absolute maximum parameter) to classify the speech signal.

The Examiner, however, cites Ertem '289, stating that the “noise reduction algorithm” implemented in a pre-compression mode, as disclosed in Ertem '289, corresponds to “estimating a noise parameter and removing the noise component from the noise parameter to generate a noise-free parameter” as specified by claim 8, and further that the combined references disclose the method specified by claim 8. Applicant respectfully disagrees.

As noted by the Examiner, Ertem '289 is directed to a “noise reduction algorithm” implemented in a pre-compression mode, and with reference to Figures 1 and 3 of Ertem '289, “Noise Reduction” block 20 is carried out prior to “Encoder” block 22 in Figure 1 of Ertem '289 and prior to “Encoder” block 36 in Figure 3 of Ertem '289. As such, Ertem '289 specifically distinguishes between noise reduction and the compression or coding portion, and thus, in pre-compression mode, Ertem '289 carries out noise reduction prior to encoding or compression. In

sum, Ertem '289 does not teach, disclose or suggest that noise reduction is performed after speech parameter extraction, which occurs during coding, and on a parameter-basis. Thus, combining the disclosures of Ertem '289 and Gersho '550 results in employing the noise reduction technique of Ertem '289 prior to the speech coding technique disclosed in Gersho '550. As explained above, neither Ertem '289 nor Gersho '550 suggests a *desirability of modifying the system of Gersho '550* to apply the background noise reduction of Ertem '289 after parameter extraction, on a parameter basis, and using a pre-determined threshold that is unaffected by noise to classify the speech signal. It is respectfully submitted that such an approach is a significant departure from the method specified by claim 8, and results in significantly increased complexity and high power and memory consumption.

Moreover, applicant notes that Ertem '289 discloses a voice activity detection scheme employing threshold adaptation (see, for example, block 44 of Figure 5 in Ertem '289). In response to applicants' arguments, the Examiner states that Figure 6 of Ertem '289 shows another type of voice activity detection that does not need "threshold adaptation". However, applicant respectfully points out that Figure 6 of Ertem '289 incorporates VAD 32 of Figure 5, which does include "threshold adaptation". Therefore, VAD 32 of Figure 6 does include "threshold adaptation" 44 of Figure 5. As noted above, such an approach results in significantly increased complexity and is a significant departure from the method specified by claim 8. For these reasons, applicant respectfully submits that the combined disclosures of Gersho '550 and Ertem '289 fail to disclose, teach or suggest the method specified by claim 8, and as such independent claim 8, and its corresponding dependent claims 11 and 24-29, are patentably

distinguishable over Gersho '550 and Ertem '289. Accordingly, claims 8, 11 and 24-28 should now be allowed.

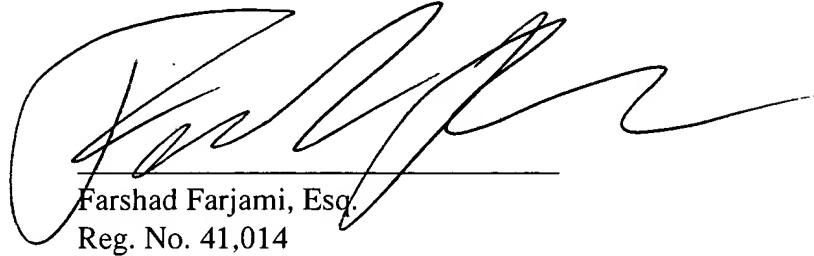
Further, new claim 48 depends from claim 11 and recites "wherein said spectral tilt parameter is weighted to generate a noise-free spectral tilt parameter during the step of removing, said pitch correlation parameter is weighted to generate a noise-free pitch correlation parameter during the step of removing and said absolute maximum parameter is weighted to generate a noise-free absolute maximum parameter during the step of removing." It is respectfully submitted that claim 48 is patentably distinguishable over the cited references at least for the reasons stated above, and also because the cited references fail to disclose, teach or suggest that each extracted parameter is weighted to generate a corresponding noise-free parameter, which is compared against a corresponding threshold to classify the speech signal.

Independent claims 20, 32 and 40 have been rejected for reasons similar to those given for rejection of claim 8. Claims 20, 32 and 40, as amended, specify limitations similar to those specified by independent claim 8. Applicant respectfully submits that independent claims 20, 32 and 40, and their corresponding dependent claims 30, 33-38, and 41-46, are patentably distinguishable over Gersho '550 and Ertem '289 for at least the same reasons that claim 8 is distinguishable over Gersho '550 and Ertem '289. Accordingly, claims 20, 30, 32-38 and 40-46 should also now be allowed.

B. Conclusion

For all the foregoing reasons, an early allowance of claims 8, 11, 20, 22 and 24-28, 30, 32-38, 40-46 and 48 pending in the present application are respectfully requested.

Respectfully Submitted;
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